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## **REMARKS**

Claims have been carefully reviewed in light of the Examiner's action.

Claims 1-3 were corrected to clarify distinct structures of the invention from prior art structures, and to overcome rejection based on being indefinite.

Claim 5 was corrected to be supported by the antecedent basis of claims 1 and 3, i.e. the plurality of systems was removed.

Claims 11 and 28 were narrowed to differentiate them from prior art structures.

Claim 26 was clarified to distinguish applicant's system from prior art structures.

No new matter has been added..

Taking claims in detail, attention will be given to the prior art patents cited by the Examiner.

### **Item 2**

The examiner stated that it is not entirely clear what structural distinction resulted in claimed improvement in claims 1-3.

The structural distinction that provides the improvement is that the combination of the hydrogen fueled internal combustion engine and hydrogen storage system with an electric propulsion system results in a longer range vehicle than a vehicle having only hydrogen fueled internal combustion engine, and which vehicles use the same amount of hydrogen, as described in the Specification page 29, lines 9-25.

Item 4

The Examiner rejected claims 1-3 under 35U.S.C. 103 (a) as being unpatentable over West (US 3,517,766) in view of Munday (US 5,143,025).

Applicant believes that his arguments should stand and defends the claims as described in his prior Amendment of May 30,2001 , Item 7, pages 4-6, and additionally on the ground, that Munday, nor West nor anyone else at the time of the invention even remotely suggested the long range hydrogen-electric hybrid vehicle of applicant, as claimed.

Apparently it was not so obvious to anyone in the art at the time of the invention , that the short range of Munday's vehicle can be overcome by electric hybrid configuration.

The electric hybrid vehicle of West, at the time of the invention was intended only to extend the range of battery-operated electric vehicle, not the hydrogen fueled vehicle with internal combustion engine. It is hereby reminded that this invention is being discussed , after election of species into hydrogen fueled vehicles category. In explaining obviousness of applicant's combination , the Examiner in Item 4, page 3, line 12 is using applicants words, not his words, when saying: "resulting in a vehicle having a longer range, as best understood". Applicant was the first to realize and discover this result, and nobody else before the time of the invention. There is nothing describing such result in references of Munday or West., or anywhere else.

The second half of the Examiner's sentence: "than a vehicle having constituent drive elements of smaller capacity" is not understood. How can a vehicle with

drive elements of smaller capacity have a shorter range , if it consumes less fuel ?

Based on this Examiner's statement, it appears that the Examiner does not understand the principle of applicant's invention.

It is well known fact , that hydrogen fueled combustion-only powered vehicles (such as vehicle of Munday) have a short range, and are not competitive with gasoline fueled vehicles, which prevented their widespread use.

Applicant's invention makes his long range non-polluting vehicle practical and competitive in the range with polluting gasoline fueled vehicles, thus fulfilling a long felt need where others have failed. Additionally, this invention offers a cost effective alternative to expensive fuel cell vehicles.

The Examiner did not and could not provide in the references cited any evidence of desirability of applicant's combination and its result, actual sample product on the record, or actual structures claimed as a whole, as described and claimed by applicant. Therefore applicant believes that claims 1-3 should be allowed.

#### Items 5 & 6

Applicant agrees with the Examiner that carbon graphite and metal hydride are known hydrogen absorbents, but believes that claims 4 and 5 should be allowed, because they are dependent on claims 1 and 3 with all of their limitations.

#### Item 7

Applicant believes that claim 6 should be allowed, because it is dependent on claims 1 and 3 with all their limitations, and additionally on the ground that mesocarbon microbeads ( MCMBs) were not known at the time of the invention as

hydrogen storage medium alone, or as a mixture with graphite and metal hydride. Examiner's reference to Takahashi at al. (US 4,985,184) is improper, because this patent does not describe anything even remotely related to use of MCMBs for hydrogen storage by absorbtion. This patent describe a molding process. Applicant's MCMBs are not used for assisting in the molding of storage element, but for storage of hydrogen by absorbtion. (page 33, lines 6-7 and page 34, lines 11-13). It is well known in the art, that hydrogen absorbents are in loose (fluidized) powder form enclosed in a vessel (tank 103), and are not as a molded solid. The Examiner agreed with applicant that MCMBs are not known as hydrogen absorbent, but rejected the claim in view of Takahashi., which rejection should be reversed.

#### Item 8

Applicant believes that claims 9 and 10 should be also allowed. Although the fuel cell vehicle of Werth is known, the mixture of carbon graphite, mesocarbon microbeads and metal hydride for hydrogen storage is not known. The Examiner's reference to Takahashi is improper as explained above.

Claims 9 and 10 are written to encompass any fuel cell vehicle within their limitations and are supported by the Specification.

#### Item 9

Claims 11 and 28 were amended and narrowed by making them dependent on claim 4 , or 5, or 6 with all their limitations. Applicant believes that claims 11 and 28 should be allowed, because of their new limitations and the Examiner's

reference to Tangri (US 4,085,709) is also improper. As applicant stated in his previous Amendment of May 30,2001 (page 8, Item13), Tangri also uses an electrolyzer in a vehicle , connected to an outside power source, but with a heavy and bulky compressor to compress the hydrogen at high pressure. This has a negative effect on the vehicle range , space and safety. Applicant describes in the Specification , Fig. 25 and claims a different system, in which the hydrogen is directly stored (absorbed) from the electrolyzer into the metal hydride , or graphite ,or mixture of metal hydride , MCMBs and graphite at low pressure, which is smaller , safer and simpler.

Tangri , West and Munday do not suggest the system or vehicle of applicant . The Examiner's rejection does not meet Applicable Court Standards, as appended in applicant's prior Amendment of May 30, 2001.

#### Item 10

Claims 11/9 and 11/10 are defended similarly as claims 11/4 ,11/5 ,11/6 in Item 9 above, except applied to fuel cell vehicle, and additionally on the grounds as explained in Items 7 and 8. In all references cited by the Examiner, there is no suggestion of applicant's vehicle combination as claimed. Therefore the Examiner's rejection does not meet the Applicable Court Standards mentioned above.

#### Item 11

Applicant amended claim 26 by inclusion of water into the partial return of exhaust gases into the intake port, which is supported by the Specification.

Laumann at al. (US 4,112,875) as referenced by the Examiner , teaches a separation

of water from the exhaust gases return. Additionally Laumann uses a closed loop inert gas system as opposed to open to air system of applicant.

Applicant uses the partial return of exhaust gases including water to cool the combustion chamber(s). Applicants remaining gasses including water leave the engine system into the atmosphere. Laumann's separates all water and returns all remaining gases into the engine to insure that all hydrogen is combusted and to maintain the closed loop.

They are two different systems for two different purposes and reasons. There is no suggestion in the references cited by the Examiner of applicant's vehicle combinations and their results, as claimed in claims 26/1 , 26/2 and 26/3, and no suggestion of partial return of exhaust gases (including water ) of the open to air engine , to cool the combustion. Therefore the claims should be allowed with all their limitations.

#### Item 12

Applicant defends the claims 27/1 and 27/3 the same way as described in his prior Amendment of May 30, 2001, page 9,Item17, and still believes ,that the Examiner misunderstood the invention. The Examiner's references to Kerrebrock at al. (US 5,372,617) and Gallagher (US 3,895,102) are improper , because Kerrebrock does not react a metal catalyst , such as ruthenium with a solution of sodium borohydride in water, ( he reacts sodium borohydride with water) , and Gallagher does not have a catalyst, just a solid reagent (ferrosilicon) or a metal, which is consumed in the reaction. Applicant's metal catalyst is not consumed - just triggers the reaction by contact with the solution, to release hydrogen on

demand from the solution of borohydride in water , and does not control the rate of generation of hydrogen, as the Examiner stated. Applicant's reaction is controlled by the amount of solution in contact with catalyst, i.e. by the valve of the Kipp reactor. In any case, none of the references cited by the Examiner suggests the combination and result , or invention of applicant, as claimed. Applicant therefore believes that claims 27/1 and 27/3 should be allowed with all of their limitations.

**Item 13**

Applicant defends claims 27/9 and 27/10 similarly as described in Item 12 above, except directed for fuel cell vehicles ,and believes that they should be allowed with all of their limitations, and are supported by the Specification.

**Item 14**

Applicant defends claims 29 and 30 similarly as in Item 12, except directed for fuel cell vehicles, and believes that they should be allowed with all of their limitations. Claims 29 and 30 are purposely written to encompass any fuel cell vehicle, and are supported by the Specification.

**Item 15**

Because the Examiner did not reject the claims based on double patenting, no response is required at this time.

However, on July 12 , 2003 applicant filed a Letter with the PTO , pertaining to Secondary Considerations for this Patent Application, which Letter is incorporated herein.

Item 16

As regards to applicant's claims having mesocarbon microbeads (MCMBs) for hydrogen storage, the Examiner agreed with applicant, that MCMBs are not known for this use, but rejected the claims in view of Takahashi patent. Applicant considers the reference to Takahashi improper, because this patent is for assisting a molding process, not even remotely related to use of MCMBs as a hydrogen absorbent. It is well known in the art, that hydrogen absorbents for vehicular applications are used in fluidized powder form, and not as a solid mold.

The Examiner indeed wrongly stated in his prior action of Nov. 30, Item13, that West's patent includes an electrolyzer, but it is now understood what he meant. In reference to Laumann, applicant corrected the claim to clearly distinguish his system of partial return of exhaust gases from Laumann's.

As regards to the evidence of the unexpected result of the invention :

The unexpected result (at the time of the invention) of longer range on the same amount of hydrogen (and approximately equivalent to the range of conventional gasoline fueled vehicle) is achieved due to the combination of the hydrogen fueled combustion engine and hydrogen storage system with an electric propulsion system, which combination permits the use of hydrogen fueled engine, which can be up to 3x smaller than the standard hydrogen fueled engine required otherwise to propel the vehicle, because the additional power for acceleration and hill climbing is provided by the electric motor with battery, when needed. It is self-evident to anyone in the art , that the 3x smaller engine consumes approximately 1/3 of hydrogen, and thus results in longer cruising range of the vehicle. No patents have been cited, which

even remotely suggest this combination and its result.

As per the Examiner's reasoning to determine obviousness of claims 1-3, applicant believes that the Examiner used hindsight reasoning. Most inventions look obvious, after they are disclosed. Obviousness cannot be established by combining teachings of prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under 35 U.S.C. 103 (a), teaching of references can be combined only if there is some suggestion or incentive to do so. Although couched in terms of combining teaching found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art.

When a rejection depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references. In re Rouffet, 149 F.3d 1350 (Fed. Cir. 1998), In re Beattie, 974 F.2d 1309, 1311-12 (Fed. Cir. 1992), In re Geiger, 815 F.2d 686,688 (Fed.Cir. 1987), In re Nomiya, 509 F.2d 566 (CCPA 1975).

It is believed that the claims define new and unobvious subject matter. Accordingly, it is believed that the Amendment places the Application in condition for allowance and such action is requested and urged.

Respectfully submitted,

  
Joseph B. Kejha  
(applicant)